

μ RS Update



(kind of)

Installation

- Installed the X-plane paddles last week before beam came back online.
- Encountered some difficulties in powering them and reading them out.
- After a lot of panicking, most of these difficulties have been resolved.
- The μ RS upgrade is installed and providing data!

Problems

- Having all appeared to be fine on the test bench, 14 out of the 30 new PMTs placed into the μ RS failed to respond once installed.
- Further testing allowed us to factorise the problem into three sources:
 - Individual quiet PMTs.
 - Issues with the HV connections to the power supply (affecting 1 or 2 paddles (\Rightarrow 2 or 4 PMTs) at a time).
 - One PMT (operating voltage 1200 V) overloading power supply when powered.

HV Problems

- 4 HV cables were identified as faulty.
- 2 simply had loose connections at the patch panel in the enclosure.
- 1 had a damaged connector at the connection to the paddle.
- 1 (“the demon cable”) generated extreme noise pulses on its PMTs and all the others when it was powered on.
 - Thought to be due to a short somewhere along the line.
 - Testing with a voltage divider indicates this is somewhere in the ~120m length between the control room and the enclosure.

HV Solutions

- Reconnected loose cables.
- Ran new cables to replace those we were unable to use.
 - Old cables are still in place, but labelled as not to be used.
- All PMTs now have working power.

Quiet PMTs

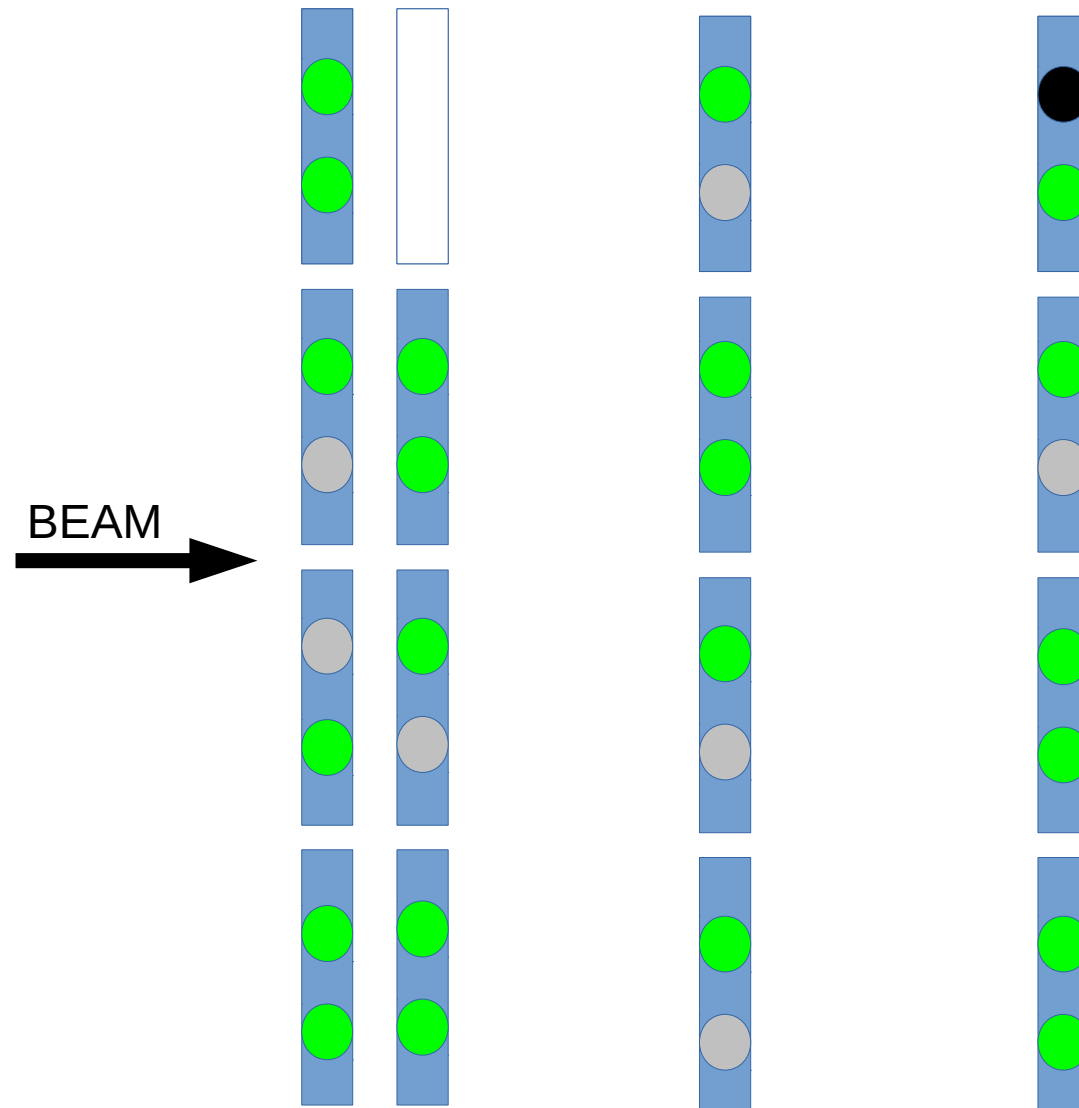
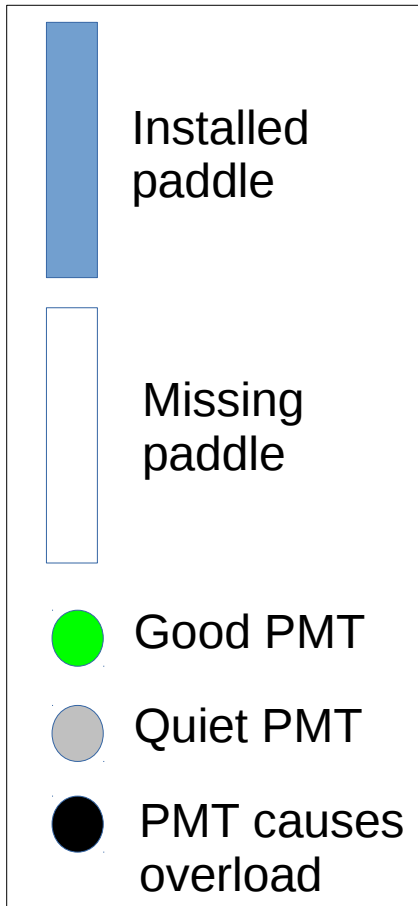
- We still have 7 PMTs that provide no pulses when powered.
- Unsure of the cause. Leading hypothesis is problems with the readout cables analogous to the HV problems.
- Left in place for now. No pairs of quiet PMTs \Rightarrow every paddle has **at least 1** functioning PMT.
- Take efficiency hit for now, investigate at next open access opportunity.

Other Problems

- PMT that causes power supply overload (needle twitches uncontrollably) is left unpowered for now (other PMT on that paddle is fine).
- One paddle is still not installed.
 - This is the one with the bad bracket + unpolished surface.
 - Assembled it as best we could and ran tests; could not achieve more than ~50% efficiency for double/triple coincidence tests.

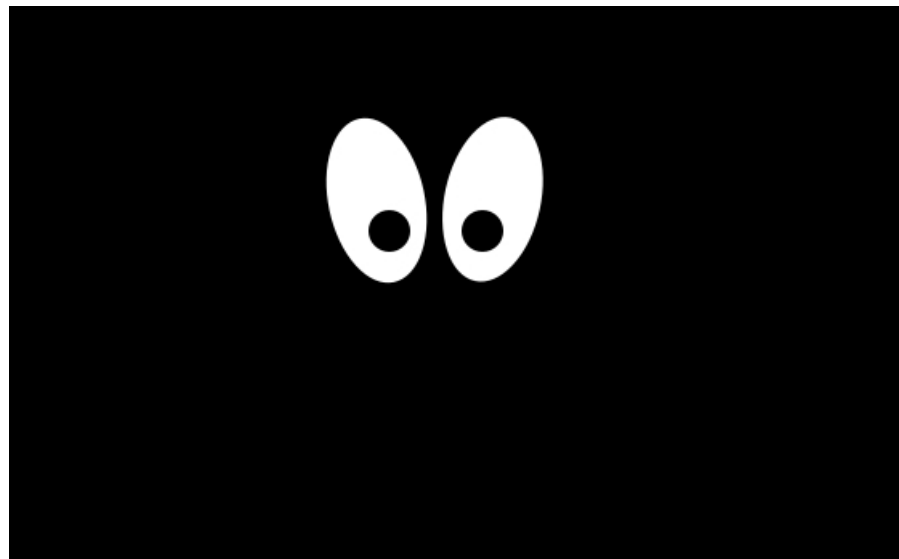
State of the Detector

KEY



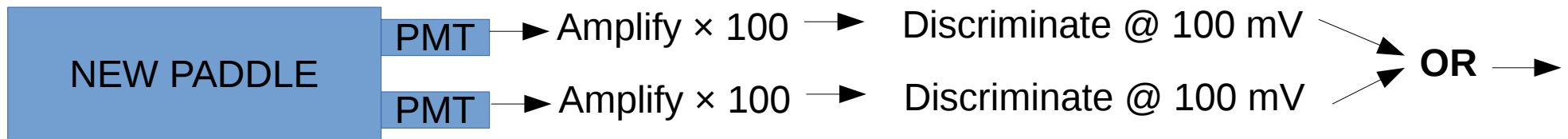
Light-tighting

- Each PMT jacketed in special light-tight paper.
- Each paddle wrapped in same paper (including PMT bracket \Rightarrow PMTs double-wrapped).
 - Weak point where the wires leave.
- Put a plastic blanket over the stack.

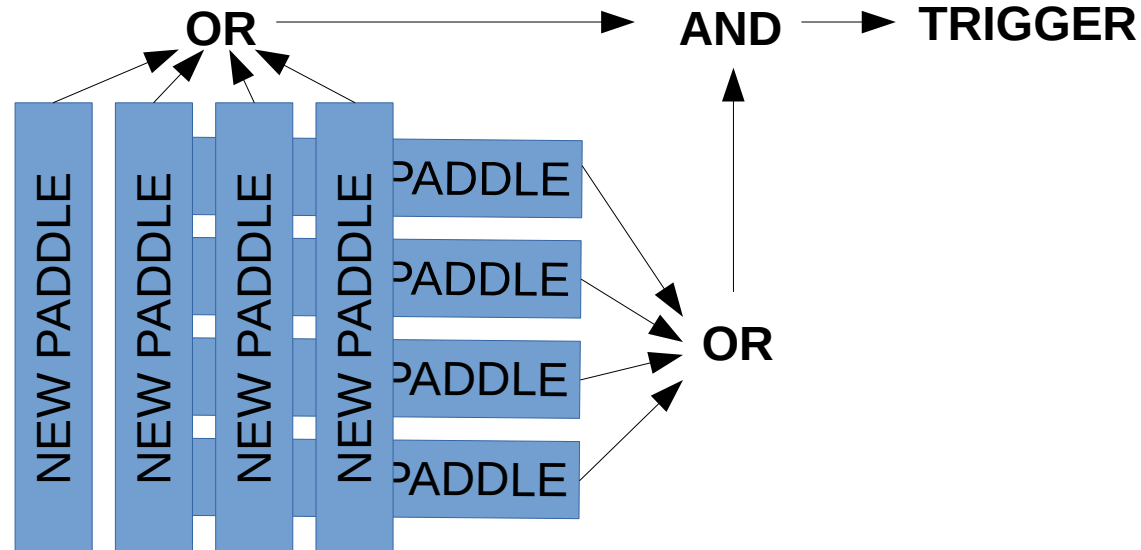


Readout

- All PMTs have been plugged into the DAQ following the scheme laid out last week.



- 4 μ RS triggers have been defined; one for each plane.



Remaining Work

- Put new channels into hardware database.
 - I will do this later today.
- Investigate quiet PMTs, try to bring them back to life.
 - Wait for reasonably long open access period.
- Look at data!
 - As soon as you like.

Huge thanks to Greg, Jason, Johnny, Miranda, Roberto and everyone else who helped out (including a 10 hr work day on Saturday) to get this done before the beam came back.

Animal Fact Friday

Crocodylians used to be a much more diverse family than they are today, with crocodiles adapted to many different ecological niches.



Simosuchus was a tiny herbivorous crocodile that would probably be a novelty pet if it were still alive today.